

MAGNETIC TUNNEL JUNCTION DEVICE WITH A COMPOSITIONALLY MODULATED ELECTRODE

ABSTRACT

A magnetic tunnel junction device with a compositionally modulated electrode and a method of fabricating a magnetic tunnel junction device with a compositionally modulated electrode are disclosed. An electrode in electrical communication with a data layer of the magnetic tunnel junction device includes a high resistivity region that has a higher resistivity than the electrode. As a result, a current flowing through the electrode generates joule heating in the high resistivity region and that joule heating increases a temperature of the data layer and reduces a coercivity of the data layer. Consequently, a magnitude of a switching field required to rotate an alterable orientation of magnetization of the data layer is reduced. The high resistivity region can be fabricated using a plasma oxidation, a plasma nitridation, a plasma carburization, or an alloying process.